

## Report on Rocks collected by Mr. G. A. Buddle from Islands of the Three Kings Group.

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On visiting Three Kings Islands some years ago, the present writer (Bartrum, 1936a) was able to land only on Great Island and saw others of the group merely from the sea. He surmised that South West Island was composed of greywacke and several of the Princes Rocks of lava, for they display prominent vertical columnar jointing. His surmise about South West Island proves to be in part if not wholly incorrect, for a rock collected by Mr. Buddle from the summit of the island is igneous and this gentleman has informed the writer that, seen from the sea, there appears to be columnar jointing on part of the steep cliff that descends to the sea from this summit, although the main mass of the island resembles the greywacke of Great Island. The igneous rock collected, however, is indistinguishable from greywacke in hand specimen but for very rare phenocrysts of feldspar about 2 mm. in length.

Thin sections were made of the solitary specimen collected from South West Island and two from several rocks macroscopically similar one to another obtained from Princes Rocks. All prove to be quartz andesites of fairly closely similar nature.

In thin section all the rocks show a good deal of weathering of their feldspar and chloritisation of the original ferromagnesian mineral, which is seen in two of the rocks to be diopsidic augite. The specimens from Princes Rocks are very similar in thin section except that the proportion of identifiable quartz is only about 3% in the one and about 10% in the other. Augite and/or chlorite constitute 10% to 15% and magnetite in small euhedral crystals about 2%, while minute needles of apatite may be fairly numerous and small grains of sphene are plentiful in the rock with the greater amount of quartz, which, however, has no surviving augite. Essentially these rocks consist of approximately 70% of feldspar as unoriented laths of plagioclase (andesine—An<sub>40</sub>) about 0.1 mm. in length with rare phenocrysts of the same mineral usually well under 1 mm. in maximum dimension. In one thin section, augite that has avoided complete chloritisation is locally abundant in small irregular crystals which occasionally show ophitic relations to the laths of feldspar. In the other section, grains of chlorite are enclosed micropoikilitically in feldspar that is between the general laths of this latter mineral.

The rock from South West Island probably represents the same lava as gave rise to the more acidic of the flows of Princes Rocks, but has cooled more rapidly, so that its texture is different. It has about 75% of plagioclase (andesine about An<sub>40</sub>) and about 15% of quartz in relatively large obvious grains. There are a few unchloritised crystals of augite, but even if all the chloritic mineral that is present is derived from this last mineral, the proportion of original augite cannot have

greatly exceeded 5%. Although there are a few small phenocrysts of plagioclase, the rock is essentially aphyric and consists of somewhat infrequent laths of plagioclase about 0.5 mm. in length with intervening sheafs of needles of plagioclase either with parallel or with somewhat radiate arrangement. About 3% of magnetite is present in small scattered octahedral crystals or in short strings of tiny crystals.

Besides chloritic minerals, the secondary minerals of all the rocks include cloudy "kaolin" and occasional yellow epidote. Minute veinlets of quartz or of quartz and calcite occasionally appear. The chloritic minerals include about equal proportions of green, poorly birefringent penninite and a deep-yellowish to reddish-yellow chlorite with high birefringence which possibly is clinocllore, but more probably is the green variety slightly oxidised to yield hematite; there is also a very small amount of a deep-bluish-green member of this same group of minerals.

The present writer (Bartrum, 1936b) has described spilitic pillow-lava and other albitic rocks from Great Island of the Three Kings group, but the rocks now recorded are not allied to these, but belong to the "Older Volcanic Series" of Bartrum and Turner (1928) which is extensive near North Cape on the mainland adjacent to Three Kings Islands and apparently is of Cretaceous age (Bartrum, 1934). This series includes altered quartz andesites which are very similar to those of the Three Kings islets.

In conclusion, the writer would thank Mr. Buddle for his interest in collecting the rocks from this inaccessible area and for his courtesy in submitting them for examination.

#### REFERENCES.

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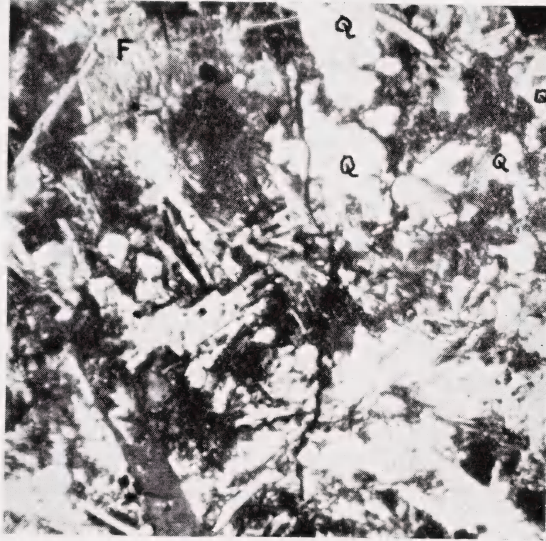
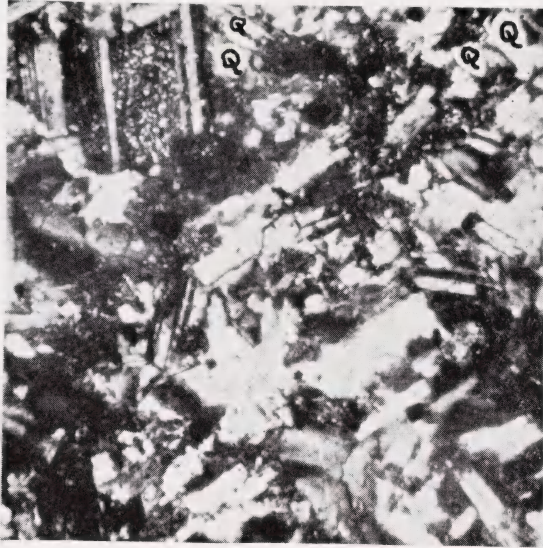


Fig. 1. Quartz andesite, Princes Rocks, Three Kings Islands. Typical texture. Grains of quartz (Q) are visible; chlorite (blackish) is here locally abundant, but plagioclase is the dominant constituent. X 64 diams. Nicols crossed.

Fig. 2. Quartz andesite, South West Island, Three Kings Islands. Much of the dark, granular material is chlorite. Quartz (Q) is locally abundant at upper right. The balance is mainly plagioclase; at F a sheaf of parallel needles of plagioclase. X 64 diams. Nicols crossed.